

**CLAIMS:**

What is claimed is:

1       1. A method in a data processing system for managing  
2       traffic in a network data processing system, the method  
3       comprising:

4               monitoring traffic for a plurality of network paths;  
5       and

6               responsive to a packet for a particular network path  
7       within the plurality of network paths causing traffic for  
8       the particular network path to exceed a level of traffic  
9       allowed, reducing an amount of bandwidth available based on  
10      a fair share for the particular network path.

11     2. The method of claim 1, wherein the traffic is measured  
12     using at least one of a data transfer rate, peak data  
13     transfer rate, burst size, and maximum packet size.

14     3. The method of claim 1, wherein the reducing step  
15     comprises:

16               reducing a congestion window size.

1       4. The method of claim 3, wherein the congestion window  
2 size is reduced as follows:

3               $CW = \max(\text{MinW}, \min(CW*F, \text{MaxW}))$   
4 wherein CW is the congestion window size, MinW is a minimum  
5 congestion window size for the particular network path,  
6 MaxW is a maximum congestion window size for the particular  
7 network path, F is a fraction to cut the congestion window  
8 size for the particular network path.

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1           responsive to aggregate traffic for a selected network  
2       path exceeding a threshold, reducing the aggregate traffic  
3       for the selected network path.

1       8.   The method of claim 7, wherein the aggregate traffic  
2       includes at least one of a data transfer rate, peak data  
3       transfer rate, burst size, and maximum packet size.

1       9.   The method of claim 7, wherein the reducing step  
2       comprises:

3           reducing a congestion window size.

1       10.   The method of claim 7, wherein the reducing step  
2       comprises:

3           reducing a sending size for data packets.

1       11.   The method of claim 7, wherein the reducing step  
2       comprises:

3           changing a type of server for data packets for the  
4       selected network path.

1       12.   The method of claim 7, wherein the threshold takes  
2       into account a fair share of bandwidth available for the  
3       plurality of network paths.

1       13. A data processing system comprising:  
2            a bus system;  
3            a communications unit connected to the bus, wherein  
4        data is sent and received using the communications unit;  
5            a memory connected to the bus system, wherein a set of  
6        instructions are located in the memory; and  
7            a processor unit connected to the bus system, wherein  
8        the processor unit executes the set of instructions to  
9        monitor traffic for a plurality of network paths; and  
10       reduce an amount of bandwidth available based on a fair  
11       share for the particular network path in response to a  
12       packet for a particular network path within the plurality  
13       of network paths causing traffic for the particular network  
14       path to exceed a level of traffic allowed.

1       14. The data processing system of claim 13, wherein the  
2       bus system includes a primary bus and a secondary bus.

1       15. The data processing system of claim 13, wherein the  
2       processor unit includes a single processor.

1       16. The data processing system of claim 13, wherein the  
2       processor unit includes a plurality of processors.

1       17. The data processing system claim 13, wherein the  
2       communications unit is an Ethernet adapter.

1       18. A data processing system comprising:  
2            a bus system;  
3            a communications unit connected to the bus, wherein  
4       data is sent and received using the communications unit;  
5            a memory connected to the bus system, wherein a set of  
6       instructions are located in the memory; and  
7            a processor unit connected to the bus system, wherein  
8       the processor unit executes the set of instructions to  
9       monitor aggregate traffic for each of a plurality of  
10      network paths; and reduce the aggregate traffic for the  
11      selected network path in response to aggregate traffic for  
12      a selected network path exceeding a threshold.

1       19. The data processing system of claim 18, wherein the  
2       bus system includes a primary bus and a secondary bus.

1       20. The data processing system of claim 18, wherein the  
2       processor unit includes a single processor.

1       21. The data processing system of claim 18, wherein the  
2 processor unit includes a plurality of processors.

1       22. The data processing system claim 18, wherein the  
2 communications unit is an Ethernet adapter.

1       23. A data processing system for managing traffic in a  
2 network data processing system, the data processing system  
3 comprising:

4                 monitoring means for monitoring traffic for a  
5 plurality of network paths; and

6                 reducing means, responsive to a packet for a  
7 particular network path within the plurality of network  
8 paths causing traffic for the particular network path to  
9 exceed a level of traffic allowed, for reducing an amount  
10 of bandwidth available based on a fair share for the  
11 particular network path.

1       24. The data processing system of claim 23, wherein the  
2 traffic is measured using at least one of a data transfer  
3 rate, peak data transfer rate, burst size, and maximum  
4 packet size.

1       25. The data processing system of claim 23, wherein the  
2 reducing means comprises:

3               means for reducing a congestion window size.

1       26. The data processing system of claim 25, wherein the  
2 congestion window size is reduced as follows:

3                $CW = \max(\text{MinW}, \min(CW*F, \text{MaxW}))$

4       wherein CW is the congestion window size, MinW is a minimum  
5       congestion window size for the particular network path,  
6       MaxW is a maximum congestion window size for the particular  
7       network path, F is a fraction to cut the congestion window  
8       size for the particular network path.

1       27. The data processing system of claim 23, wherein the  
2 reducing means comprises:

3               setting means for setting a type of service for  
4       packets sent using the particular network path.

1       28. The data processing system of claim 23, wherein the  
2 reducing means comprises:

3               dropping means for dropping the packet.

1       29. A data processing system for managing traffic in a  
2 network data processing system, the data processing system  
3 comprising:

4                 monitoring means for monitoring aggregate traffic for  
5 each of a plurality of network paths; and

6                 reducing means, responsive to aggregate traffic for a  
7 selected network path exceeding a threshold, for reducing  
8 the aggregate traffic for the selected network path.

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1       33. The data processing system of claim 29, wherein the  
2 reducing means comprises changing a type of server for data  
3 packets for the selected network path.

1       34. The data processing system of claim 29, wherein the  
2 threshold takes into account a fair share of bandwidth  
3 available for the plurality of network paths.

1       35. A computer program product in a computer readable  
2 medium for managing traffic in a network data processing  
3 system, the computer program product comprising:  
4             first instructions for monitoring traffic for a  
5             plurality of network paths;

6             second instructions, responsive a packet for a  
7             particular network path within the plurality of network  
8             paths causing traffic for the particular network path to  
9             exceed a level of traffic allowed, for reducing an amount  
10            of bandwidth available based on a fair share for the  
11            particular network path.

1       36. The computer program product of claim 35, wherein the  
2 traffic is measured using at least one of a data transfer  
3 rate, peak data transfer rate, burst size, and maximum  
4 packet size.

1       37. The computer program product of claim 35, wherein the  
2 reducing step comprises:

3              third instructions for reducing a congestion window  
4 size.

1       38. The computer program product of claim 37, wherein the  
2 congestion window size is reduced as follows:

3               $CW = \max(\text{MinW}, \min(CW * F, \text{MaxW}))$

4       wherein CW is the congestion window size, MinW is a minimum  
5 congestion window size for the particular network path,  
6 MaxW is a maximum congestion window size for the particular  
7 network path, F is a fraction to cut the congestion window  
8 size for the particular network path.

1       39. The computer program product of claim 35, wherein the  
2 second instructions comprises:

3              instructions for setting a type of service for packets  
4 sent using the particular network path.

1       40. The computer program product of claim 35, wherein the  
2 second instructions comprises:

3              instructions for dropping the packet.

1       41. A computer program product in a computer readable  
2       medium for managing traffic in a network data processing  
3       system, the computer program product comprising:

4                 first instructions for monitoring aggregate traffic  
5       for each of a plurality of network paths; and

6                 second instructions, responsive to aggregate traffic  
7       for a selected network path exceeding a threshold, for  
8       reducing the aggregate traffic for the selected network  
9       path.

1       42. The computer program product of claim 41, wherein the  
2       aggregate traffic includes at least one of a data transfer  
3       rate, peak data transfer rate, burst size, and maximum  
4       packet size.

1       43. The computer program product of claim 41, wherein the  
2       second instructions comprises:

3                 instructions for reducing a congestion window size.

1       44. The computer program product of claim 41, wherein the  
2       second instructions comprises:

3                 instructions for reducing a sending size for data  
4       packets.

1       45. The computer program product of claim 41, wherein the  
2 second instructions comprises:

3             instructions for changing a type of server for data  
4 packets for the selected network path.

1       46. The computer program product of claim 41, wherein the  
2 threshold takes into account a fair share of bandwidth  
3 available for the plurality of network paths.